

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

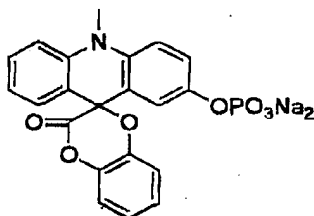
AMENDMENT TO THE CLAIMS

1-7. (Cancelled)

8. (Currently amended) The chemiluminescent substrate of claim 4 wherein said counter ions A are selected from the group consisting of  $\text{CH}_3\text{SO}_4^-$ ,  $\text{FSO}_3^-$ ,  $\text{CF}_3\text{SO}_3^-$ ,  $\text{C}_4\text{F}_9\text{SO}_3^-$ ,  $\text{CH}_3\text{C}_6\text{H}_4\text{SO}_3^-$ , halide,  $\text{CF}_3\text{COO}^-$ ,  $\text{CH}_3\text{COO}^-$ , and  $\text{NO}_3^-$ .

9-21. (Cancelled)

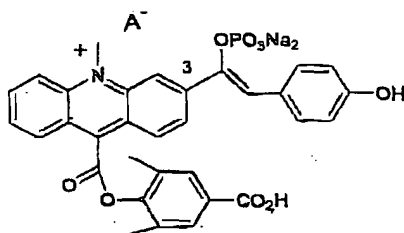
22. (Currently amended) The chemiluminescent substrate of claim 21 having the following structure:



23-24. (Cancelled)

25. (Currently amended) The ~~A~~ chemiluminescent substrate of claim ~~23~~ having the following structure,

Application No. 09/626,566  
Filed: July 27, 2000  
Group Art Unit: 1651



wherein A<sup>-</sup> is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said counter ion A<sup>-</sup> is selected from the group consisting of CH<sub>3</sub>SO<sub>3</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, C<sub>4</sub>F<sub>9</sub>SO<sub>3</sub><sup>-</sup>, CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>3</sub><sup>-</sup>, halide, CF<sub>3</sub>COO<sup>-</sup>, CH<sub>3</sub>COO<sup>-</sup>, and NO<sub>3</sub><sup>-</sup>.

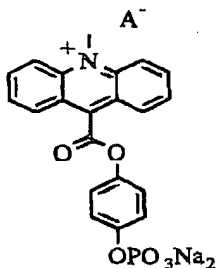
Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

26-28. (Cancelled)

29. (Currently amended) ~~The~~ A chemiluminescent substrate ~~of~~  
~~claim 26~~ having the following structure:

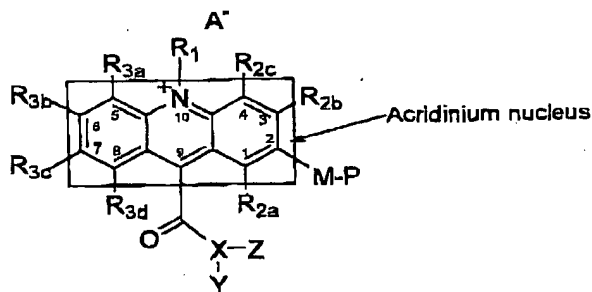


wherein  $A^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said counter ion  $A^-$  is selected from the group consisting of  $CH_3SO_3^-$ ,  $FSO_3^-$ ,  $CF_3SO_3^-$ ,  $C_4F_9SO_3^-$ ,  $CH_3C_6H_4SO_3^-$ , halide,  $CF_3COO^-$ ,  $CH_3COO^-$ , and  $NO_3^-$ .

30-42. (Cancelled)

43. (Currently amended) ~~The~~ A chemiluminescent substrate of a hydrolytic enzyme, said substrate having the structure

Application No: 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651



wherein

P is  $\text{PO}_3\text{Na}_2$  or a sugar moiety;

M is oxygen;

$R_1$  is selected from the group consisting of methyl, sulfopropyl and sulfobutyl;

$R_{2a}$ ,  $R_{2b}$ ,  $R_{2c}$ ,  $R_{3a}$ ,  $R_{3b}$ ,  $R_{3c}$  and  $R_{3d}$ , are hydrogen;

$A^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $A^-$  not being present if said  $R_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

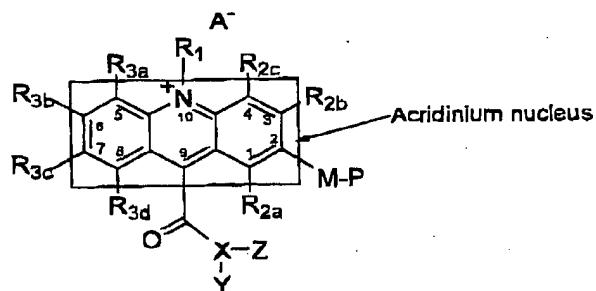
X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, and (2',6'-dimethyl-4'-carboxyl)phenyl; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651

44. (Currently amended) ~~The~~ A chemiluminescent substrate of a hydrolytic enzyme, said substrate having the structure,



wherein

P is  $\text{PO}_3\text{Na}_2$  or a sugar moiety;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of methyl, sulfopropyl and sulfobutyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3a}$ ,  $\text{R}_{3b}$ ,  $\text{R}_{3c}$  and  $\text{R}_{3d}$ , are hydrogen;

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being present if said  $\text{R}_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

Application No. 09/626,566  
Filed: July 27, 2000  
Group Art Unit: 1651

X is O; Y is selected from the group consisting of phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, and (2',6'-dimethyl-4'-carboxyl)phenyl; and Z is omitted.

45. (Previously added) The chemiluminescent substrate of claim 43, wherein

P is  $\text{PO}_3\text{Na}_2$ ;

X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

46. (Previously added) The chemiluminescent substrate of claim 43, wherein

P is  $\text{PO}_3\text{Na}_2$ ;

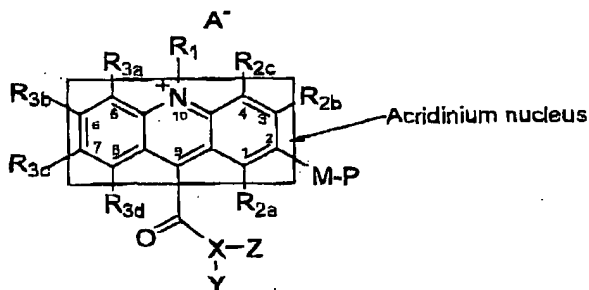
X is S; Y is selected from the group consisting of phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, and (2',6'-dimethyl-4'-carboxyl)phenyl; and Z is omitted.

47. (New) A chemiluminescent substrate of a hydrolytic enzyme, said substrate having the structure

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651



wherein

P is  $\text{PO}_3\text{Na}_2$  or a sugar moiety;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of sulfoalkyl and carboxymethyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3a}$ ,  $\text{R}_{3b}$ ,  $\text{R}_{3c}$  and  $\text{R}_{3d}$ , can be the same or different, selected from the group consisting of hydrogen, methyl, methoxy, halides, and cyano ( $-\text{CN}$ );

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being present if said  $\text{R}_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-

Application No. 09/626,566

Filed: July 27, 2000

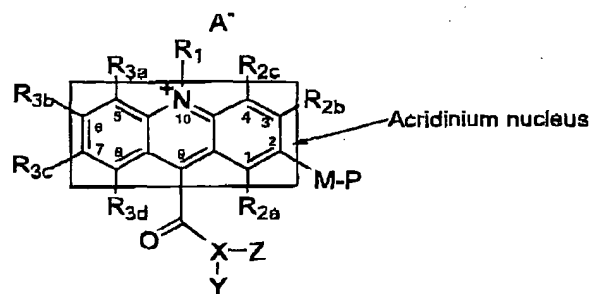
Group Art Unit: 1651

benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl, (2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

48. (New) The chemiluminescent substrate of claim 47 wherein said counter ions  $A^-$  are selected from the group consisting of  $CH_3SO_4^-$ ,  $FSO_3^-$ ,  $CF_3SO_3^-$ ,  $C_4F_9SO_3^-$ ,  $CH_3C_6H_4SO_3^-$ , halide,  $CF_3COO^-$ ,  $CH_3COO^-$ , and  $NO_3^-$ .

49. (New) A chemiluminescent substrate of a hydrolytic enzyme, said substrate having the structure



wherein



Application No. 09/626,566  
Filed: July 27, 2000  
Group Art Unit: 1651

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$  and  $\text{C}(=\text{O})\text{R}$  group wherein R is an alkyl group having 1 to 6 carbon atoms;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3a}$ ,  $\text{R}_{3b}$ ,  $\text{R}_{3c}$  and  $\text{R}_{3d}$ , can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, and cyano ( $-\text{CN}$ );

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being present if said  $\text{R}_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl,

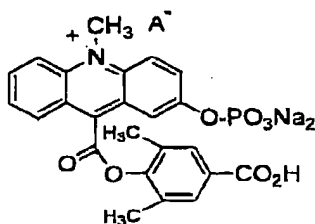
Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651

(2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl;; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

50. (New) The chemiluminescent substrate of claim 49 wherein said counter ions  $A^-$  are selected from the group consisting of  $CH_3SO_4^-$ ,  $FSO_3^-$ ,  $CF_3SO_3^-$ ,  $C_4F_9SO_3^-$ ,  $CH_3C_6H_4SO_3^-$ , halide,  $CF_3COO^-$ ,  $CH_3COO^-$ , and  $NO_3^-$ .

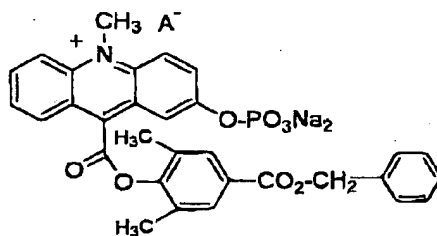
51. (New) The chemiluminescent substrate of Claim 43 having the structure,



wherein  $A^-$  is selected from the group consisting of  $CH_3SO_4^-$ ,  $FSO_3^-$ ,  $CF_3SO_3^-$ ,  $C_4F_9SO_3^-$ ,  $CH_3C_6H_4SO_3^-$ , halide,  $CF_3COO^-$ ,  $CH_3COO^-$ , and  $NO_3^-$ .

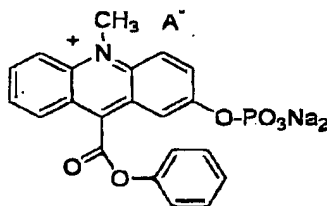
Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651

52. (New) The chemiluminescent substrate of Claim 43 having the structure,



wherein A<sup>-</sup> is selected from the group consisting of CH<sub>3</sub>SO<sub>4</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, C<sub>4</sub>F<sub>9</sub>SO<sub>3</sub><sup>-</sup>, CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>3</sub><sup>-</sup>, halide, CF<sub>3</sub>COO<sup>-</sup>, CH<sub>3</sub>COO<sup>-</sup>, and NO<sub>3</sub><sup>-</sup>.

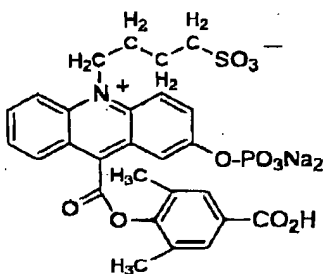
53. (New) The chemiluminescent substrate of Claim 43 having the structure,



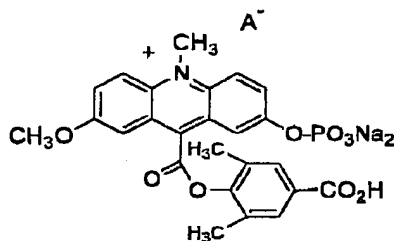
wherein A<sup>-</sup> is selected from the group consisting of CH<sub>3</sub>SO<sub>4</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, C<sub>4</sub>F<sub>9</sub>SO<sub>3</sub><sup>-</sup>, CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>3</sub><sup>-</sup>, halide, CF<sub>3</sub>COO<sup>-</sup>, CH<sub>3</sub>COO<sup>-</sup>, and NO<sub>3</sub><sup>-</sup>.

Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651

54. (New) The chemiluminescent substrate of Claim 43 having the structure



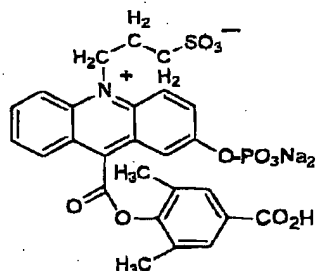
55. (New) The chemiluminescent substrate of Claim 47 having the structure,



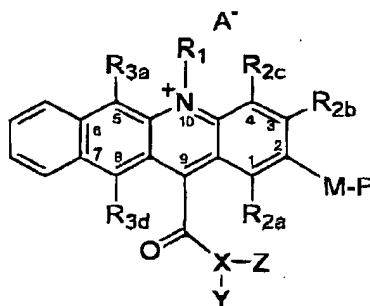
wherein A<sup>-</sup> is selected from the group consisting of CH<sub>3</sub>SO<sub>3</sub><sup>-</sup>, FSO<sub>3</sub><sup>-</sup>, CF<sub>3</sub>SO<sub>3</sub><sup>-</sup>, C<sub>4</sub>F<sub>9</sub>SO<sub>3</sub><sup>-</sup>, CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>3</sub><sup>-</sup>, halide, CF<sub>3</sub>COO<sup>-</sup>, CH<sub>3</sub>COO<sup>-</sup>, and NO<sub>3</sub><sup>-</sup>.

56. (New) The chemiluminescent substrate of Claim 43 having the structure

Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651



57. (New) A chemiluminescent substrate of having the structure



wherein

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$ ,  $\text{PO}_3\text{Na}_2$ , a sugar moiety and  $\text{C}(=\text{O})\text{R}$  group wherein R is an alkyl group having 1 to 6 carbon atoms;

Application No. 09/626,566  
Filed: July 27, 2000  
Group Art Unit: 1651

M is oxygen;

R<sub>1</sub> is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

R<sub>2a</sub>, R<sub>2b</sub>, R<sub>2c</sub>, R<sub>3a</sub>, and R<sub>3d</sub>, can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, cyano (-CN), ;

A<sup>-</sup> is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said A<sup>-</sup> not being present if said R<sub>1</sub> substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

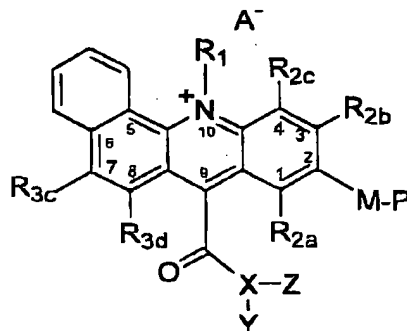
X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl, (2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

Application No. 09/626,566  
 Filed: July 27, 2000  
 Group Art Unit: 1651

58. (New) A chemiluminescent substrate having the structure



wherein

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$ ,  $\text{PO}_3\text{Na}_2$ , a sugar moiety and  $\text{C}(=\text{O})\text{R}$  group

wherein R is an alkyl group having 1 to 6 carbon atoms;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3c}$  and  $\text{R}_{3d}$ , can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, and cyano ( $-\text{CN}$ );

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

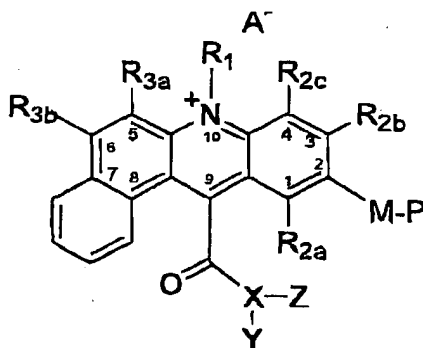
present if said  $R_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl, (2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

59. (New) A chemiluminescent substrate having the structure



-19-

WEINGARTEN, SCHURGIN,  
GARDINER & LEBOVICI LLP  
TEL. (617) 542-1290  
FAX. (617) 451-0313



Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

wherein

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$ ,  $\text{PO}_3\text{Na}_2$ , a sugar moiety and  $\text{C}(=\text{O})\text{R}$  group wherein R is an alkyl group having 1 to 6 carbon atoms;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3a}$ , and  $\text{R}_{3b}$  can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, cyano ( $-\text{CN}$ ), ;

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being present if said  $\text{R}_1$  substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-

Application No. 09/626,566

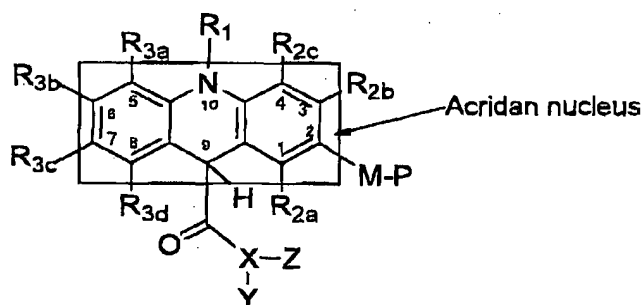
Filed: July 27, 2000

Group Art Unit: 1651

benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl, (2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl,; and Z is omitted; and

when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

60. (New) A chemiluminescent substrate of a hydrolytic enzyme, said substrate having the structure



wherein

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$ ,  $\text{PO}_3\text{Na}_2$ , a sugar moiety and  $\text{C}(=\text{O})\text{R}$  group wherein R is an alkyl group having 1 to 6 carbon atoms;

M is oxygen;

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

R<sub>1</sub> is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

R<sub>2a</sub>, R<sub>2b</sub>, R<sub>2c</sub>, R<sub>3a</sub>, R<sub>3b</sub>, R<sub>3c</sub> and R<sub>3d</sub>, can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, cyano (-CN), ;

A<sup>-</sup> is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said A<sup>-</sup> not being present if said R<sub>1</sub> substituent contains a strongly ionizable group that can form an anion and pair with the quaternary ammonium cationic moiety; and

X is selected from the group consisting of O, N or S, such that,

when X is O or S, Y is selected from the group consisting of phenyl, (2'-methyl)phenyl, (2'-methoxy)phenyl, (2',6'-dimethyl)phenyl, (2'-methyl-6'-methoxy)phenyl, (2',6'-dimethyl-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethoxy-4'-benzyloxycarbonyl)phenyl, (2'-methyl-6'-methoxy-4'-benzyloxycarbonyl)phenyl, (2',6'-dimethyl-4'-carboxyl)phenyl, (2',6'-dimethoxy-4'-carboxyl)phenyl, and (2'-methyl-6'-methoxy-4'-carboxyl)phenyl,; and Z is omitted; and

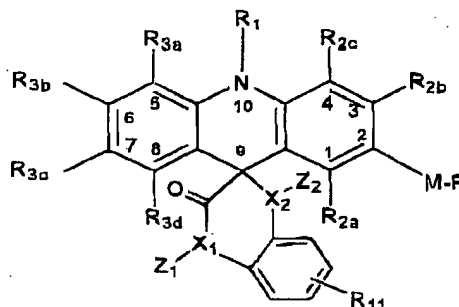
when X is N, Z is toluenesulfonyl, and Y is carboxypropyl.

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

61. (New) A chemiluminescent substrate of a hydrolytic enzyme,  
said substrate having the structure



wherein

P is selected from the group consisting of  $\text{PO}_3\text{H}_2$ ,  $\text{PO}_3\text{K}_2$ ,  $\text{PO}_3(\text{NH}_4)_2$ ,  $\text{PO}_3\text{Ca}$ ,  $\text{PO}_3\text{Mg}$ ,  $\text{PO}_3\text{Na}_2$ , a sugar moiety and  $\text{C}(=\text{O})\text{R}$  group wherein R is an alkyl group having 1 to 6 carbon atoms;

M is oxygen;

$\text{R}_1$  is selected from the group consisting of methyl, sulfopropyl, sulfobutyl, sulfoalkyl, and carboxymethyl;

$\text{R}_{2a}$ ,  $\text{R}_{2b}$ ,  $\text{R}_{2c}$ ,  $\text{R}_{3a}$ ,  $\text{R}_{3b}$ ,  $\text{R}_{3c}$  and  $\text{R}_{3d}$ , can be the same or different, selected from a group consisting of hydrogen, methyl, methoxy, halides, cyano ( $-\text{CN}$ ), ;

$\text{A}^-$  is a counter ion for the electroneutrality of the quaternary nitrogen of the acridinium compounds, said  $\text{A}^-$  not being present if said  $\text{R}_1$  substituent contains a strongly ionizable group

Application No. 09/626,566

Filed: July 27, 2000

Group Art Unit: 1651

that can form an anion and pair with the quaternary ammonium cationic moiety; and

$X_1$  and  $X_2$  are the same or different and are selected from the group consisting of O, N or S, such that,

when  $X_1$  and  $X_2$  are O or S,  $R_{11}$  is selected from the group consisting of hydrogen, -R, substituted or unsubstituted aryl, halides, nitro, sulfonate, sulfate, phosphonate,  $-CO_2H$ ,  $-C(O)OR$ , cyano (-CN), -SCN, -OR, -SR, -SSR,  $-C(O)R$ ,  $-C(O)NHR$ , ethylene glycol, or polyethylene glycol, where R is as defined above; and  $Z_1$  and  $Z_2$  are omitted; and

when at least one of  $X_1$  and  $X_2$  is N,  $Z_1$  and  $Z_2$  are toluenesulfonyl, and  $R_{11}$  is carboxypropyl.